PROVINCE OF ALBERTA

HIGH SCHOOL AND UNIVERSITY MATRICULATION EXAMINATIONS BOARD.

DEPARTMENTAL EXAMINATIONS, 1935.

CHEMISTRY 1.

Time—2½ hours.

Note.—Calculations in all problems should be carried to completion. Atomic weights: H = 1; Ca = 40, Cl = 35.5; Fe = 56; K = 39; O = 16; S = 32.

Values.

5 **1.** (*a*) Describe an experiment to show that magnesium when ignited in air combines with a portion of the air.

2 (*b*) Write the equation for the reaction in (*a*).

3 (*c*) The product obtained by burning magnesium in air is soluble in water. State *three* chemical properties of the solution.

2. The process of reduction is well illustrated when hydrogen is passed over heated copper oxide. Give answers to the following questions based upon this experiment.

3 (*a*) What is a practical method for the preparation of the hydrogen required?

1 (*b*) How is the hydrogen dried for use in the experiment?

1 (*c*) Why is the copper oxide heated?

1 (*d*) What color change occurs during the reaction?

4 (*e*) What compound is formed during the reaction? How could the composition of this compound be accurately determined from this experiment?

2 (*f*) What is meant by the term reduction as exemplified by this experiment?

Values.

8 **3.** *Either* What weight of potassium chlorate is required to prepare 16.8 litres of oxygen measured at 0°C. and 684 mm. pressure?

Or

4 (*a*) 18 grams of a compound contain 8.4 grams of iron and 9.6 grams of sulphur. Calculate the simplest formula for the compound.

4 (*b*) What weight of water is required to slake a ton of lime?

5 **4.** (*a*) Describe a laboratory experiment to illustrate the Law of Conservation of Weight.

6 (*b*) State the Law of Definite Proportions. Do the compounds water and hydrogen peroxide provide an exception to this law? Give reasons in support of the answer.

4 **5.** (*a*) $AlCl_3$ is the formula for aluminium chloride. Write the formula for each of the following compounds of aluminium:
hydroxide, sulphite, sulphide and phosphate.

5 (*b*) $HClO_3$ is the formula for chloric acid. Give the chemical name for the compound represented by each of the formulae:
$HClO_2$; $NaClO_3$; $Ca(ClO)_2$; $Mg(ClO_4)_2$; and $KClO_2$.

6 **6.** (*a*) Using common salt as one of the materials, describe the laboratory preparation and collection of hydrogen chloride.

2 (*b*) Write the equation for the reaction in (*a*).

3 (*c*) Account for the bleaching action of moist chlorine.

15 **7.** Write the equation for the reaction in *any five* of the following cases. Indicate a practical application for each reaction chosen.

(*a*) Dilute hydrochloric acid is warmed with manganese dioxide.

(*b*) Steam is passed over red-hot coke.

(*c*) A mixture of sodium nitrite and ammonium chloride is heated gently.

(*d*) Dilute sulphuric acid is added to a solution of chloride of lime (bleaching powder).

Values.

(*e*) Water is allowed to drop slowly upon calcium carbide.

(*f*) Ammonium chloride and slaked lime are thoroughly mixed and heated gently.

6 **8.** (*a*) Describe a laboratory method for the preparation and collection of sulphur dioxide.

2 (*b*) Write the equation for the reaction in (*a*).

2 (*c*) State *two* commercial uses of sulphur dioxide or the sulphites.

8 **9.** *Either* (*a*) State clearly what is meant by *any four* of the following expressions. Give an example of each one discussed:

acidic anhydride; dibasic acid; catalytic agent; deliquescent substance; neutralization; acid radicle.

6 (*b*) It is frequently necessary in laboratory work to separate a precipitate from a solution. How is this separation effected? Why and how would the precipitate be washed after separation?

8 *Or* (*a*) Describe a commercial method for the preparation of nitric acid. Write the equation for the reaction.

3 (*b*) State the test used to identify a nitrate in solution.

3 (*c*) Write a note on an explosive prepared from nitric acid, stating its composition and specific uses.

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